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The Citrus Industry

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No. 4

RIL, 1955

Insect Control
April, 1955

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Purple Mites
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Section

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Table

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OW, FLORIDA

Florida Grapefruit Day In Washington

It was Florida Grapefruit Day on Capitol Hill in Washington as Congressman A. S. (Syd) Herlong, Jr., (center) invites two of his colleagues to sample some of Florida's finest fruit. (Left) Congressman Frank Ikard, (D), Texas; and (Right), Congressman William M. Colmer, (D), Miss. The Florida Citrus Commission furnished free grapefruit for all members of the House and the Senate to celebrate the occasion.

XUM

Royal Purple Citrus Research Nursery

(Established in 1930)

Offers a service vital to the needs of our changing Citrus Industry

The citrus plant-breeder Donald John Nicholson has perfected after 25 years of continual research such valuable new and promising varieties as follow:

A splendiid new series of high-quality seedless NAVEL ORANGES. Many of which he has bred from seeds of several outstanding type varieties of navel oranges.

Dream Navel
(Patented) Now widely propagated.

Paradise Navel
(Patented)

Improved Late Pineapple Orange
A large-fruited, red, glossy-rinded orange, prolific, which matures in February lasting into April.

Parker Navel
Brand New—(Excellent quality. An extremely heavy producer.)

Nicholson Navel
Brand New—(Of equal quality to Parker and fully as prolific.

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Brand New Type.—Very large, seedless, excellent for salad purposes. Size: 14 to 17 ounces.

Nicholson Early Sweet Seedless Grapefruit
Brand New—Valuable.

Nicholson Naveled Grapefruit
Rare — very unique.

Nicholso Early Seedless Valencia
Matures 6 weeks before regular type valencia oranges. Very firm, seedless, delicious, large fruit. A very recent development.

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A most remarkable and extremely promising brand new orange with exotic raspberry-strawberry flavor. JUICE, a rich deep pink, or even cherry color. Pigment in the juice as well as the segment walls. A SENSATIONAL FRUIT.

Early Seedless Concentrate Orange
Just developed. The Dream of all smart growers. Matures in October. Rich, high juice-color, solids 14.50. Perhaps Florida's most valuable orange.

Golden Honey Orange
Grown only by this Nursery. Flavor unlike any other citrus fruit. Very prolific.

Nicholson Early Tangerine
BRAND NEW. Developed from seeds of a King Orange. Free peeling; orange-red skins, tangerine-colored flesh; delicious flavor; matures weks ahead of Dancy Tangerine.

None of the above developments are yet offered to the public; only the now famous DREAM NAVEL ORANGE can be purchased from three Nurseries.

This Research Nursery deals only in the development of new high-improved varieties of citrus fruits required to meet the present and future requirements for stabalizing this great industry. Only the very finest types are ever offered to Nurseries for propagation after severe tests.

We are striving diligently to build a much firmer foundation upon which to further the interests of a still greater citrus future—THRU QUALITY PRODUCTS ONLY. To rectify the mistakes of the past.

This announcement is for the express purpose of creating greater interest in producing and selling superfine citrus fruits thereby creating less sales resistance and splendid profits for all concerned.

We firmly believe that rare, fine flavors in citrus fruits can and will do wonders—if given a real trial.

—We hope you may prosper thru our long efforts.—

Donald John Nicholson
Sole Owner and Plant Breeder Grower

Royal Purple Citrus Research Nursery

1224 Palmer Street Telephone 25467 Orlando, Florida

XUM

R. M. Pratt

Citrus Insect Control

R. B. Johnson

For April 1955

W. L. THOMPSON,
R. M. PRATT
R. B. JOHNSON*
Florida Citrus Experiment Station, Lake Alfred

W. L. Thompson

The principal problems facing the grower in the post-bloom period are the control of purple scale, and purple and six-spotted mites. The spring hatch of purple scale will have reached its peak in the last week in March, and a high percentage of the scales will be in the first two stages during April. Infestations are generally high, and young scales are settling on the new leaves.

Purple mite activity in the third week in March was the highest in the five years of record. This was based on counts made on the old leaves, but spring flush leaves are also becoming heavily infested. Present indications are that the average infestation in April and May will be even higher than in 1951. However, purple mites are very sensitive to wet weather, and an extensive rainy period could change the situation and reduce the population.

Six-spotted mite infestations have been increasing steadily since December, and injury to new leaves is becoming common. Severe injury will result in many groves during April and May if these mites are not controlled. Infestations are more severe on grapefruit than oranges and tend to recur in groves which have been damaged in previous years. The mites are usually more numerous in the western and northern districts than in other areas. A careful check should be made for these mites, especially in groves where a dormant miticide was not applied.

Mealybug infestations are increasing and may be expected to be unusually severe this year.

A peak of red scale hatching was reached late in March, but infestations are generally light, and control will be required in only a few groves in the post-bloom period.

Written March 24, 1955. Reports of surveys by Harold Holtsberg, Cocoa; J. W. Davis, Tavares; K. G. Townsend, Tampa; J. B. Weeks, Avon Park; and T. B. Hallam, Lake Alfred.

Rust mite infestations are generally light and may be expected to remain at low levels through April.

SPRAY PROGRAM

The post-bloom period is one of the most important times to spray for control of the various insects, mites and diseases of citrus. This year purple scale and purple mite infestations are numerous and six-spotted mites are likely to be in groves where miticides have not been applied since early January. A high percentage of purple scale is now in the younger stages and can be easily killed with a scalicide. A scalicide should be applied in groves with medium to heavy infestations because severe damage may develop before mid-June, especially if dry weather continues. A scalicide at this time should prevent infestations on young fruit until the mid-summer spray.

Purple mite is severe in most areas and, if the weather remains dry, may cause a leaf drop of spring foliage. Mesophyll collapse may also develop on spring growth by June if the mites are not controlled. Leaf drop is not so likely to occur, however, if groves are well irrigated or if there is sufficient rainfall to keep the trees in a vigorous condition.

Six-spotted mites are likely to cause a severe leaf drop of spring foliage if they are not controlled. This species of mite is not particularly difficult to kill, but very thorough coverage of the under surfaces of the leaves is necessary. The under surface of the petiole of the leaf is a favorite feeding area and is difficult to cover with spray unless a very careful application is made.

Melanose control is most satisfactory where the copper spray is applied soon after the petals have dropped. There is a considerable amount of small dead wood this year as a result of purple mite infestations, loss of leaves from greasy spot and damage from cold weather. In groves where fruit is to be sold for fresh fruit, the copper spray should be applied as soon as possible because it has to prevent an infection of melanose rather than correct it.

Nutritional elements such as compounds of zinc and manganese as well as borax and molybdemm are often applied at this time of the year as well as arsenic on grapefruit. Most of these elements can be combined in one spray providing oil is not used. If oil is used for mite or scale control, not more than two of these materials should be added to the emulsion. On grapefruit, copper and lead arsenate can be combined with oil. Some injury to oranges may develop where both zinc and copper are combined in an oil spray, but results are usually satisfactory where only one of these compounds is used with the oil emulsion. If zinc is needed, it would be better to wait and apply it in a later sulfur spray. All of the fungicides, nutritional elements, miticides and sulfur can be combined with parathion. If either zinc sulfate or manganese sulfate is used with parathion, the minimum amount of lime should be used to neutralize these materials. See the Better Fruit Program for the correct amount of lime to use.

Scale Control: Be sure there is sufficient moisture in the soil where oil is to be used and make the application before the average size of fruit is over 1/2 inch in diameter to prevent oil blotch. This blemish is more likely to develop on oranges than on grapefruit. Oil applied during dry weather may cause a heavy drop of young fruit. Do not use 1.3% oil on Valencias that will have to be degreened, but 0.7% oil plus 1 pound of parathion per 100 gallons has not severely retarded degreening of mature oranges. Oil does not affect solids of mature Valencias. If any other spray materials are added to the oil emulsion, be sure to check the solution to see if there is flocculation. If flocculation does occur, contact the manufacturer of the oil emulsion to obtain the proper deflocculator.

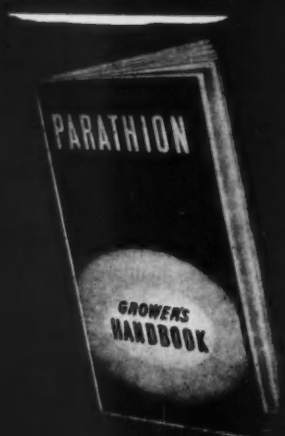
Parathion can be used at 1 pound of 15% wettable powder per 100 gallons

(Continued on page 18)

PARATHION

These insect pests — controlled when you spray with parathion

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
FLORIDA RED SCALE	●	●	●	●	●	●	●	●	●	●	●	●
PURPLE SCALE	●	●	●	●	●	●	●	●	●	●	●	●
SNOW SCALE				●	●	●	●					
COTTONY-CUSHION SCALE	●	●	●	●	●	●	●	●	●			
WHITEFLY			●	●			●	●		●	●	
MEALYBUG	●	●	●	●	●	●	●					
APHID		●	●	●	●							



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Effectiveness Of Miticides For Purple Mites In The Indian River Area

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Since 1949 the damage caused by e purple mite (**Metatetranchus citri**) as increased in severity to such an xtent that the mite is now a pest f first ranking importance (5). This particularly true in the Indian iver area, where prior to 1950 the urple mite was thought to be of ttle importance (2). The cause of e increased populations and damage as not been entirely explained, but oth weather conditions as well as ther spray practices have been amed with some justification (2,5).

Increased prevalence of purple mites the Indian River area has caused e application of miticides in many roves although some growers doubt e effectiveness of presently recom-ended miticides in the coastal areas. nce 1952 the authors have tested th recommended and prospective iticides in the Indian River citrus gion to determine their effective-as under coastal conditions. The sults of four field experiments are esented below.

Methods

All of the experiments were of ndomized block design. Mite popu-tions were determined by inspecting th sides of 25 or 33 leaves per tree r the presence of one or more mites. two experiments, each plot con-ted of three trees, and the plots ere replicated three times. Obser-tions were made on 33 leaves per ee in these cases. In the other ex-riments, single tree plots were used, d these were replicated six times.

W. T. LONG

The trees were rather small so that observations were made on only 25 leaves per tree in these cases. All trees were sprayed thoroughly with ordinary high pressure machines, using hand guns.

Experiment 1. In May 1952, a block of 12 year old Marsh grapefruit trees was observed to have an 80 percent infestation of purple mite. The area was organized into three blocks of nine plots, each plot consisting of three trees. The nine treatments listed in Table 1 were applied May 28, 1952. After one week all the miticides used had given an appreciable degree of control. After one month, 1.3 percent oil, and 3 quarts of oil plus 12 ounces of parathion (15% 0, o-diethyl 0, p-nitrophenyl) appeared to be giving reasonably good control, as did also 1 lb. EPN 300 (27% 0-ethyl 0-p-nitrophenyl benzenethiophosphonate), and 1 ½ lbs. Neotran (40% bis (p-chlorophenoxy)-methane), but the results were complicated by other factors. In the check plots the population had dropped from 72 percent to 20 percent in a three week interval due to natural mortality. In the same period the wettable sulfur plots failed to show an equal drop in population, presumably due to the effect of wettable sulfur in reducing the natural mortality. The extended period of low mite populations after the oil sprays may have been partly due to noninterference with natural mortality, but the good results with mixtures containing sulfur must have been due to the miticide. Of the materials applied with sulfur, EPN gave a notably longer period of control than the others according to the two month count. In all other treatments where sulfur was combined with the miticides

there were more mites than in the unsprayed check.

Experiment 2. In September 1952 another section of the Marsh grapefruit grove used in Experiment 1 was found to have a purple mite infestation of over 90 percent. The area was organized into three blocks of

W. L. THOMPSON

16 plots each. Treatments as listed in Table 2 were applied October 3-4, 1952. During the first month of the experiment, 18 inches of rain fell, and the proportion of infested leaves in the checks was reduced from 90 percent to 25 percent. Under these conditions, oil emulsion, oil-parathion combinations, Ovotran (50½ p-chlorophenyl-p-chlorobenzenesulfonate), DN 111 (20% dinitro-o-cyclohexylphenol, dicyclohexylamine salt), and EPN were fairly satisfactory up to one month. After two months the variability among plots tended to obscure the results, but the same materials showed some degree of control.

Experiment 3. In December 1952, a severe infestation of purple mite was observed in a 9 year old Valencia orange grove in the Header Canal locality near Ft. Pierce. The area was divided into six blocks of 12 single tree plots, and treatments listed in Table 3 were applied December 10, 1952. Relatively cool and dry conditions prevailed during the course of the experiment, and the infestation in the check plots increased instead of declining as in Experiments 1 and 2. The results of the one, four, and six week counts (Table 3) demonstrated the reliability of Ovotran, EPN, DN 111, DN Dry Mix (40½ dinitro-o-cyclohexylphenol), and Neotran. The Florida formulation of Armite (15% 2-p-tert-butylphenoxy)isopropyl 2 chloroethyl sulfite) also was effective. Control by all materials was inadequate after two months; however, EPN, Ovotran, and DN compounds gave relatively lower populations than the other materials used.

Experiment 4. In June 1953 a commercial block of 12 year old Hamlin orange trees was observed to be severely infested with purple mite. Over 90 percent of the leaves were infested and each infested leaf had approximately 10 mites. The treatments listed in Table 4 were applied on June 12. Rain fell shortly after the treatments were applied, and total rainfall for the month following the application of sprays was 6.24 inches, but little drop in population occurred in the check plots during this period. At the end of one week, good initial kills were obtained with EPN, DN 111, liquid Ovotran, Neotran, Aramite, and the oil-parathion combination sprays. At the end of one month the infestation was again very high in

H. J. REITZ

TABLE 2
Results Obtained in Miticide Trials on Marsh Grapefruit Sprayed Oct. 3-4, 195

Material and Concentration	Percent Infested Leave Oct. 11	Oct. 29	Dec.
1.3% oil	1	2	
2 qt. oil + 12 oz. parathion/100 gal.	18	12	
3 qt. oil + 12 oz. parathion/100 gal.	9	6	
Ovotran, 1 lb./100 gal. (a)	21	1	
Ovotran, 1 1/2 lb./100 gal. (a)	14	2	
Liquid Ovotran, 1 qt. (a) (b)	17	3	
Liquid Ovotran 2 1/2 pt. +1.25 parathion/100 gal. (a)	6	3	
Parathion alone 1 1/2 lb./100 gal.	37	46	
Parathion emulsion 1 pint of 25%/100 gal.	42	54	
DN 111 1 1/4 lb./100 gal. (a)	7	4	
Neotran 1 1/2 lb./100 gal. (a)	9	14	
Aramite (Florida Formulation) 1 1/2 lb./100 gal. (a)	6	21	
EPN 300 1 lb./100 gal. (a)	15	0	
Wettable Sulfur 8 lb./100 gal. (a)	82	67	
Water only	70	45	
No Spray	75	25	

(a) Received wettable sulfur at 8 lb./100 gallons.
(b) Equivalent in active ingredient to 1 lb. of wettable powder.

TABLE 1
Results Obtained in Miticide Trials on Marsh Grapefruit Sprayed May 28, 1952.

Material and Concentration	Percent Infested Leaves June 5	June 24	July 25
1.3% oil	1	3	1
2 qt. oil + 12 oz. parathion/100 gal.	1	33	18
3 qt. oil + 12 oz. parathion/100 gal.	1	9	9
DN 111, 1 1/4 lb./100 gal. (a)	4	33	37
Ovotran 1 lb./100 gal. (a)	14	27	22
Neotran 1 1/2 lb./100 gal. (a)	1	6	31
EPN 300 1 lb./100 gal. (a)	1	7	7
Wettable sulfur 8 lb./100 gal.	70	69	63
No Spray	72	20	8

(a) Received 8 lb. wettable sulfur/ 100 gallons.

all plots. Lowest population after one month resulted from use of the 3 quarts oil plus parathion combination. Also, better than average results were obtained with the 2 quart oil plus parathion combination, and with EPN at 1.5 pounds per 100 gallons. In no case was satisfactory control obtained under the conditions which prevailed during this experiment.

Discussion

In all these experiments, the

good results were obtained with the standard miticides which have been recommended or are now being recommended. Oil emulsion was used in two trials and was the best material used in both experiments. DN Dry Mix was used in only one trial, but was as good as any other material in that test. DN 111 was fairly satisfactory, although it failed in Experiment 1. Neotran was used in all trials with fairly good results. Ovotran was used in all four trials and in two formulations, and was generally satisfactory except in two cases when used at 1 pound per 100 gallons. Aramite was used in three trials, but was slightly less satisfactory than the materials listed above. Under some conditions, none of the available miticides gave a long period of control. These data lead to the conclusion that results of miticide trials conducted elsewhere in Florida are applicable to Indian River conditions. Similar results have been reported by Norman and Spencer (1).

Some of the best results were obtained with oil-parathion mixtures. Twelve ounces of 15 percent parathion plus three quarts of 84 percent oil emulsion in 100 gallons gave a quick initial kill as well as a long period of control. Two quarts of oil were not as satisfactory as three. Similar results were reported by Thompson (4). This mixture has been used considerably in Central Florida, but has been used very little in the Indian River area. More widespread use of this combination could be made, thus avoiding a part of the harmful effects of regular strength oil emulsion sprays and gaining reasonably good control of purple mite and scale.

Good results were also obtained from use of EPN 300. In all four trials EPN held up very well in comparison with all other materials. EPN was used at 1 or 1.5 pounds per 100 gallons, with the 1 pound rate appearing to be adequate. Norman and Spencer (1) have also reported good results with EPN at 1 pound per 100 gallons. Thompson (3) has reported that 6 to 10 ounces of EPN per 100 gallons gave good initial control but lacked residual effect. No injurious effects of EPN on trees or fruit were noted during the course of these four experiments, but possibly at other times trees might be more susceptible. In addition to inadequate information on toxicity, economic factors as well as compatibility with other materials are not entirely known. Since EPN is a phosphatic material, the same precautions in handling as with parathion are required. As far as known, no commercial use of this material has been made on citrus in Florida, but field testing on a limited basis would be desirable.

Materials tested which did not appear promising at the rates studied included Metacide (a mixture of parathion; O, O-p-nitrophenyl thiophosphate; and other related organic phosphates), Malathion (25% O, O-dimethyl dithiophosphate of dimethyl mercapto succinate), and Chlorobenzilate (2 hydroxy-2, 2-bis(4-chlorophenyl ethyl acetate).

Results of miticide trials conducted in St. Lucie County confirm results of similar trials in Central Florida. Miticides which have been recommended appear to be as effective under Indian River conditions as elsewhere in Florida but under some conditions a long period of control is unobtainable. Good results were also obtained with oil-parathion combination sprays, and with EPN 300. The latter material appears promising and should be tested on a larger scale.

TABLE 3
Results Obtained in Miticide Trials on Valencia Orange Trees Sprayed Dec. 10, 1952

Materials	Amount Per 100 Gallons	Percent Infested Leaves Dec. 17, 1952	Jan. 7, 1953	Jan. 22, 1953	Feb. 6, 1953
Ovotran	1 lb. (a)	5	7	7	41
Liquid Ovotran	1 qt. (a) (b)	9	5	13	59
Aramite (Florida Formulation)	lb.	9	16	19	62
Parathion alone	1.5 lb.	6	56	56	94
Parathion emulsion	1 pt.	3	45	59	93
Dn 111	1.25 lb. (a)	8	6	15	47
DN Dry Mix	0.67 lb. (a)	1	6	17	45
Neotran	1.5 lb. (a)	7	15	11	67
EPN 300	1.0 lb. (a)	3	0	9	35
Wettable sulfur	8 lb. (a)	12	23	46	89
Water alone		33	65	71	97
No Spray		48	71	78	93

(a) Received wettable sulfur at 8 lbs. 100 gallons.
(b) Equivalent to 1 lb. wettable powder.

Table 4
Results Obtained in Miticide Trials on Hamlin Orange Trees Sprayed June 12, 1953

Material and Concentration	Percent Infested Leaves June 19	July 10
2 qt. oil + 12 oz. parathion	6	61
3 qt. oil + 12 oz. parathion	2	28
Parathion 1 lb./100 gal.	56	68
Ovotran 1 lb./100 gal. (a)	33	93
Liquid Ovotran 1 qt./100 gal. (b)	4	81
DN 111 1.25 lb./100 gal. (a)	4	95
Neotran 1.50 lb./100 gal. (a)	4	92
Aramite (Fla. Formulation 2 lb./100 gal.)(a)	7	89
EPN 1 lb./100 gal. (a)	0	74
EPN 1.5 lb./100 gal. (a)	5	61
Chlorobenzilate 1 pt./100 gal.	34	85
Malathion 1 lb./100 gal. (a)	38	95
Metacide 1 pt./100 gal.	53	77
Liquid lime sulfur 1 gal./100 gal.	55	97
Wettable sulfur 8 lb./100 gal. (a)	78	95
No Spray	94	84

(a) Received sulfur at 8 lb./100 gallons.
(b) Equivalent to 1 lb. wettable powder.

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Root Distribution In Relation To The Water Table

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AT MEETING
FLORIDA STATE HORTICULTURAL SOCIETY

The citrus root system is capable of rapid and deep growth in sandy soils but will not grow into or exist long in a soil saturated with water. Thus, when the water table is within a few feet of the surface the roots are confined to a shallow zone and fluctuating water levels have a pronounced effect on the root system. Water damage to citrus trees, a major problem in the Indian River area, also occurs on the West Coast and in many Central Florida groves.

To further study water table influence, observations have been made during the past year in a citrus grove at Largo, Florida that is equipped with an extensive drainage system. The soil in this grove varies between Blanton and Leon fine sand and has an organic hardpan present at depths from two to five feet. Mr. W. D. Owens, the owner, designed and installed the drainage system in his 80 acre grove in 1950. Six inch drain tile was laid six feet deep with elaborate manholes and valves at intervals for observation, control of water level, and ease of cleaning the lines. The tile drainage system consisted of one central drain line with four alternating lateral drains laid perpendicular to the central line. Thus several blocks of trees were tile drained on two and three sides. The central drain line began at a manhole 750 feet from the west side of the grove so that a large block of trees was located beyond the western boundary of the drain field. An open ditch, 18 feet wide and nine feet deep, had been dug on the west side of the grove in 1948.

The distribution of feeder roots of 54 mature trees was studied under three drainage control conditions in the Owens grove in June 1954; namely, grapefruit trees tile drained on two sides (Fig. 1), orange trees located beyond the end of a drain line (Fig. 2), and grapefruit trees in the vicinity of an open drainage ditch. The tree plots were further subdivided according to the distance from the ditch or drain tile.

An adjoining grove with the same elevation and subsoil characteristics as the Owens grove but without a drainage system was selected for comparison. Twelve trees were studied within a one acre area in this grove.

An adjusting auger, set for a diameter of eight inches, was used to sample feeder roots (1).

RESULTS

In the undrained comparison grove feeder root distribution of 30 year old orange tres subjected to extensive root damage from a shallow water table showed considerable variation in root development as indicated in Table 1. Trees with less than nine

Table I
Root Distribution(1) in Relation to a Fluctuating Shallow Water Table in an Undrained Grove

Depth in Inches	Three locations within one acre area(2) 1	2	3
0 - 10	8.5	5.1	1.6
10 - 20	7.7	3.8	.1
20 - 30	.8	.9	
TOTAL	17.0	9.8	1.7
Max. root depth	30"	25"	20"
Water table	40"	35"	35"
Tree height	16.5'	15'	14.8'

(1) An average of six trees expressed as grams dry wt. in a column one foot square the height of each zone.
(2) Numerous dead feeder roots below 15 inches. Some trees dying from water damage.

grams of dried feeder roots in a square foot column 30 inches deep presented typical water damage symptoms of deadwood and spare foliage. Location 1 was five inches higher than the surrounding area. The additional height was apparently sufficient for good root development to a depth of 20 inches.

The trees in the water damaged grove represent conditions similar to that found in the Owens grove prior to 1950. In June 1954 grapefruit trees growing adjacent to a drain line six feet deep (Fig. 1) has a profuse quantity of feederroots to a depth of six feet as shown in Table II.

Table II
Root Distribution(1) at Three Locations Perpendicular to a Title Drain Line Buried 6 Feet Deep

Depth in Inches	Distance from drain tile 10 ft.	70 ft.	130 ft.
0 - 10	7.1	4.6	3.6
10 - 20	3.6	3.6	6.0
20 - 30	5.7	6.4	7.6
30 - 40	8.6	9.7	8.8
40 - 50	5.2	5.8	2.0
50 - 60	2.2	.9	.8
60 - 70	.5		
TOTAL	32.9	31.0	28.8
Max. root depth	68"	60"	57"
Water table	70"	70"	68"
Tree height	19.2'	19.0'	19.1

(1) An average of six trees expressed as grams dry wt. in a column one foot square the height of each zone.

Within four years the root system had grown from an original depth of 30 inches to 70 inches. Root concentration in the 30 - 40 inch depth zone was greater than in the 0 - 10 inch zone. Feeder roots were found to within two inches of the water table indicating rather critical control of the water table.

Trees 70 feet from the tile appeared to be just as healthy as trees adjacent to the tile. The concentration of feeder root was almost identical to that of trees 10 feet from the tile. The high concentration of roots below 30 inches in the soil suggests that good drainage was evident.

Trees 130 feet from the drain tile showed a high root concentration to a depth of five feet. Root development was similar to trees closer to the tile except for reduced root growth below 40 inches.

All of the trees studied within 130 feet of the drain tile were uniform in height and had a higher root concentration in the 30 - 40 inch zone

than is common for trees growing on deep well drained sand (2). It seems reasonable to conclude that the water table, when stabilized, may enhance the growth of feeder roots above the water table in fine sandy soil.

Root distribution of 20 year old Hamlin oranges located beyond the end of a drain tile (Fig. 2) is shown in Table III. The manhole at the

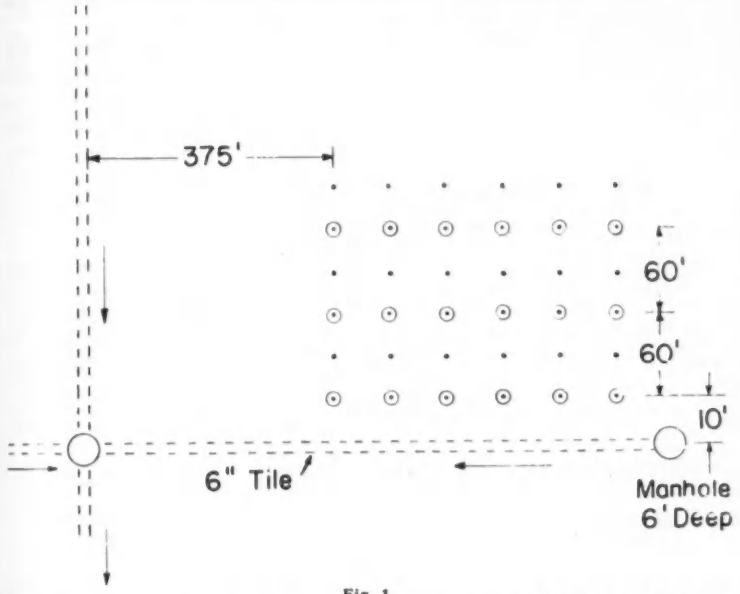

Fig. 1
Location of 18 trees selected for feeder root measurements in relation to tile drainage on two sides of a seven acre grapefruit block. The small circles represent trees examined.

end of the tile was 4½ feet deep, the shallowest position of the drainage system. It was interesting to note that the water table was lowered for a considerable distance beyond the

Table III
Root Distribution(1) Beyond the Terminus of a Drain Tile Buried 4½ Feet Deep

Depth in Inches	Distance beyond drain tile 15 ft.	130 ft.	220 ft.
0 - 10	5.7	5.0	8.0
10 - 20	11.9	2.5	3.0
20 - 30	12.7	6.5	1.8
30 - 40	2.5	1.0	.5
40 - 50	.2		
TOTAL	33.0	15.0	13.3
Max. root depth	47"	40"	38"
Water table	52"	45"	38"
Tree height	16.5'	15.2'	12.5'

(1) An average of six trees expressed as grams dry wt. in a column one foot square the heighth of each size.

manhole. A reduction in size of the trees was evident 130 feet from the manhole. Trees within 15 feet of the manhole were 16.5 feet in height and had a high concentration of feeder roots to a depth of 40 inches with a maximum root depth of 47 inches. At 130 feet from the manhole significant reduction in feeder root concentration was evident. At 220 feet the root system was similar to that in the water damage grove (Table 1) and the trees were only 12.5 feet high. Thus in four years the trees near the manhole where stabilized drainage was obtained, had grown four feet taller with twice the feeder root distribution as compared with trees on poorly draind soil 220 feet from the manhole.

An open ditch dug deep enough to drain below the organic hardpan functioned in a manner similar to the underground tile system. As shown in Table IV, trees within 20 feet of the ditch had a total root concentration that compared favorably with the trees located near the 4½ foot deep manhole. Feeder roots were present in quantity to within two inches of the water table at a distance of 115 feet from the ditch. Water damage to the feeder roots was evident 220 feet from the ditch and tree height was four feet less compared with trees near the ditch.

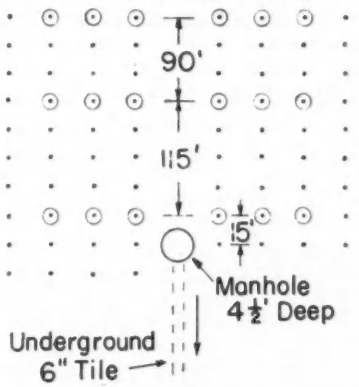

Fig. 2
Location of 18 trees selected for feeder root measurements in relation to the end of a tile drain line. The small circles represent trees examined.

It should be noted that the water level in the ditch was controlled at four and one-half feet by the use of soil dams and overflow pipes. The water control valves were opened permanently in July 1954 and the water level in the ditch was lowered to seven and one-half feet. The water table at the 220 feet position was lowered from 40 inches (June 1954) to 66 inches as measured in September 1954. Root distribution will be studied in July 1955 to note any changes that may occur with a lower water table.

Table IV
Root Distribution (1) at Three Locations Perpendicular to Diversion Ditch with the Water Level Held at 56 Inches

Depth in Inches	Distance from ditch 20 ft.	115 ft.	220 ft.
0 - 10	6.6	2.6	4.2
10 - 20	6.4	4.4	3.7
20 - 30	7.2	6.0	3.7
30 - 40	3.1	3.0	1.7
40 - 50	.2	2.4	.5
TOTAL	24.1	18.4	13.8
Max. root depth	50"	40"	40"
Water table	55"	42"	40"
Tree height	18'	17.5'	14'

(1) An average of six trees expressed as grams dry wt. in a column one foot square the height of each zone.

Summary

1. Stabilizing the water table at a lower level increased the total rooting area and the newly developed root survived without periodic destruction.

2. Lowering the water table 30 to 70 inches doubled the quantity of feeder roots in four years and increased the size of the trees.

3. The feeder root concentration in the deep rooting zone (30 - 70") was greater than in the 0 - 10 inch zone and considerably higher than is usual for trees growing on deep well drained sands.

4. When root distribution was above 13 grams (expressed as dried feeder roots in a sq. ft. column) a visible increase in tree size could be noted.

Literature Cited

1. Ford, Harry W. 1953. The effect of spreading decline on the root distribution of citrus. Proc. Fla. State Hort. Soc. 65: 47-50.

2. Ford, Harry W. 1954. Unpublished data, Fla. Citrus Exp. Sta.

Don't Rush Valencias Until They Get Ripe

The continuously cold weather we have had this winter has had its effect on the quality of our citrus fruit. I should say the weather has caused our fruit to take on the characteristics of California fruit. We find a great deal of difference in the way our fruit has matured this year over other years. California oranges, as a rule, have much brighter color, thicker skins, higher solids and more acid. Florida oranges this year are very much like that. I have been in this business for more than 35 years, and I cannot remember when our Valencia oranges have been as highly colored as this year. Grapefruit, oranges and tangerines all have thicker skins than they normally do. The solids have been much higher than last year, and there is much more acid than usual. This has been especially true of mid-season and late fruit. The early fruit was almost normal, but it did not come in contact with the cold weather before it was picked.

W. C. PEDERSEN, PRESIDENT
IN LETTER TO
WAVERLY GROWERS COOPERATIVE, DATED MARCH 9

How is this change in maturity affecting our crop? Tangerines and oranges have not grown as large as usual. Single strength orange juice canners have been able to can as much as usual because they are allowed the use of sugar. However, frozen orange concentrators have had a difficult time much of the season finding tangerines and oranges with high enough ratios (sugar to acid) to permit canning it without mixing the fruit with higher ratio crops held over in barrels from last year or the early part of this year. Tangerines have been so low in ratio that it was February of this year before we could run the concentrate juice directly into the cans and freeze it. Many crops of fruit had to be held and put in barrels and frozen to wait for sweeter juice that could be added to it in order to meet required standards.

The fact is that on February 19 there were 3,343,348 gallons of frozen juice in barrels in the hands of the concentrators in Florida. Practically all this juice was sour juice waiting for very ripe fruit to mix with it to make it palatable. If processors have this great quanitity of sour juice on hand, then it is reasonable to assume that they will not be anxious to put up more high-acid fruit from the early Valencias that are now being picked. This means that there will be many frozen concentrate operators that will be forced to shut down until the fruit is more mature and will meet the concentrate standard.

We feel the growers should know the reason they are closing and should not get panicky when there are no buyers sitting on their door-steps every day wanting to take the fruit off tomorrow. There is plenty of room in the market to take every box of Valencias we grow this year at a good price if we are not in too big a hurry to get them off our trees. A little slow-down on the part of fresh-fruit shippers and processors will make a stronger market later on and will mean a better price for our products.

Reuther To Be Head Of Horticulture At U. of F. June 1

Dr. Walter Reuther, principal horticulturist at the USDA citrus laboratory in Orlando, on June 1, will be Horticulture in the University of Florida College of Agriculture, Agricultural Expriment Station and Extension Service, Gainesville.

His appointment to the combined position, approved by the State Board of Control, has been announced by Dr. J. Wayne Reitz, provost for agriculture.

Dr. Reuther graduated from the University of Florida College of Agriculture in 1933 and obtained his doctor's degree from Cornell University in 1940.

From 1933 to 1937 he was assistant horticulturist with the Florida Agricultural Experiment Station at Gainesville and the Citrus Station at Lake Alfred. From 1937 to 1940 he was assistant in pomology at Cornell and after obtaining his advanced degree became assistant professor of pomology for a short while.

In 1941 he joined the U. S. Department of Agriculture to do tung oil research and was stationed at the Florida Experiment Station in Gainesville. From 1942 to 1946 he was in charge of the USDA date gardens at Indio, California. Since 1946 he has been at Orlando, where his work has attracted widespread attention.

DR. WALTER REUTHER

"Dr. Reuther will assume leadership of all horticultural work on the University campus," says Dr. Reitz. "He will head the research and teaching program and will be responsible for coordinating the subject matter for Extension Service specialists. This arrangement will insure a closer and more effective relationship of all staff

members working in the field of horticulture on the main campus.

"As is the case in other combined departments, Dr. Reuther will be responsible to Director W. M. Fifield of the Agricultural Experiment Station for the research program in horticulture at Gainesville, to Director H. G. Clayton of the Agricultural Extension Service for leadership in horticultural subject matter for extension specialists, and to Dean C. V. Noble for the undergraduate and graduate teaching program in horticulture."

Notes Of The Trade

W. R. "BUSTER" HANCOCK JOINS TAMPA CONCERN

It has been announced by the Board of Directors of Superior Fertilizer and Chemical Company, that W. R. "Buster" Hancock, at a special meeting of the Board held in Winter Haven

W. R. (BUSTER) HANCOCK

on March 15, was elected General Manager of the Company, replacing G. Dexter Sloan who has held that position since 1945. Mr. Sloan becomes President of the company.

Mr. Hancock is a native Floridan having been born in Madison county, receiving his grade and high school education in Aucilla in Jefferson county. After graduating from Aucilla high school he played professional baseball for two years and then entered the University of Florida, graduating from the College of Agriculture. Immediately upon graduating Mr. Hancock joined the United States Marines and was located in the Pacific theater as a bomber pilot, being honorably discharged as a Captain at the end of the war.

Mr. Hancock, affectionately known as "Buster", is one of the better known young men in Florida agriculture. He is 37 years old, married to the former Lucille M. McLeod. They have three children. He is President of the Young Adult Class of the Edge Memorial Methodist Church of Groveland; he has an honorary degree in the Future Farmers of America.

At the same meeting of the Board of Directors, Ralph Roane, a graduate of the University of Florida in Business Administration, was elected Secretary of the company; A. Doel Rothwell who had been serving as Secretary became Production Manager in charge of factory operations, and Howard A. Thullbery who has had the title of Assistant General Manager became Sales Manager. Mr. Thullbery is the present President of the Florida State Horticultural Society.

In making the above changes, Mr. Sloan became President and Chief Executive Officer of the company. Mr. Tom B. Swann of Winter Haven, who has served as President since 1945, became Vice President, along with Mr. D. A. Hunt of Lake Wales, still however retaining his position on the Executive Committee. These two gentlemen with Mr. J. R. Graves of Vero Beach, Mr. M. H. Mabry of Tampa and Mr. G. D. Sloan constitute the Executive Committee of the organization.

GENTILE BROTHERS AGAIN ACTIVE

Gentile Bros. Company is again active in the fresh fruit deal, shipping largely from their Fort Pierce Indian River groves, also from the interior.

Several changes have taken place in their sales and traffic departments. Lawrence Gentile, Jr., is now Sales Manager. T. M. (Tom) Jackson has been appointed Traffic Manager, filling the vacancy left by the passing of popular H. C. (Hub) Gettier who was so well and favorably known to the industry.

The company expects to be active in the grapefruit deal until along in June.

FOUR FFA CHAPTERS TO WIN NATIONAL HONORS

Search is on for four FFA chapters, one from each of four regions of the country as established by the U. S. Office of Education, which will win national honors and share in a $2,000 expense fund for trips to Purdue University for the summer conference, August 7-11, of the American Institute of Cooperation. Basis of the awards is chapter members' understanding of, and participation in the cooperative form of business organization.

Objectives of the contest, basis of selection, score card to be used in selecting winners, and general rules were announced recently by J. K. Stern, President of the Institute, which is the national educational and research organization for farmer cooperatives.

"This year, instead of one winner as in the past two contests, there will be four winners receiving certified award plaques and expense funds selected from among state winners certified by the State Supervisor of Vocational Agriculture, or State FFA officials." Stern said. "Each chapter winning state honors will receive an appropriate certificate award."

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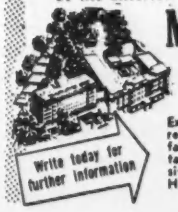

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Organic Farming With Chemical Fertilizers

RICHARD BRADFIELD

Organic matter maintenance has long been regarded as one of the primary objectives and best criteria of good soil management. More farmers would probably rate it at the top than any other single factor involved. Why this high repute? In the first place, I think it is because of the diversity of its effect on soils. Organic matter influences the properties of any given soil in many different ways. In the second place, I think it is because of the universality of its beneficial effects.

Practically all soils, regardless of texture, series, or great world group, are improved by additions of organic matter. Every agronomist should learn the value of organic matter early in his career. When a farmer approaches with a difficult soil problem, I always advise my students to listen intently as he describes his problem, question him thoroughly to bring out the points which he may have overlooked in his diagnosis of the situation, make such minor suggestions as may seem appropriate, but in case of doubt always to top off their advice by recommending a liberal application of barnyard manure!

If the importance of organic matter maintenance is so widely appreciated, why should this topic arise in a meeting of this sort? One of the reasons is that we have many new situations to meet in farming today. As a result, both farmers and scientists are questioning the necessity under present day conditions of some of the traditional practices. Much of the farming in the United States in the past, with a few notable exceptions, such as the tobacco farms of Virginia, Maryland and North Carolina, the cotton farms of the South, and the wheat farms of the Great Plains, was the general livestock type. Organic matter maintenance is a relatively simple matter for a general livestock or dairy farmer. He will normally keep from 25 to 50 percent of his land in pasture and forge crops, in both of which perennial sod-forming legumes will ordinarily be present. He will market these forage crops and a high proportion of his grain crops in the form of livestock or livestock products, and consequently can return large quantities of animal manure to his fields each year. This manure with the residues from his leguminous forage crops, if supplemented with even modest quantites of the proper chemical fertilizers, will, in most cases, do a fairly good job of maintaining the organic matter content of the soil.

But farming is changing in the United States. It is becoming a more competitive and a more highly specialized business. The horse has practically disappeared as a source of farm power. Many large farms have no livestock whatsoever. Without livestock, there is seldom a profitable outlet for a very large acreage of leguminous forages, and there is no manure. Farmers on such farms are asking us to re-examine the question: Just how important is the maintenance of organic matter on my soil, and with my type of farming?. How little can I get by with? How can I best provide that little? And how can I get the most out of that little? We have had but little experience with these questions in their modern setting. By modern setting I mean situations in which, first, land and labor are priced higher than ever before; second, larger capital investments in highly specialized machinery are indispensable; third, ample supplies of commercial fertilizer are available at prices which compare more favorably than ever before with the prices received for most crops. Each of these factors has an important influence upon the feasibility of soil organic matter maintenance on the present day American farm.

Much of our thinking about organic matter in the past has been rather vague and general. It is still regarded as an entity in much of our thinking. We commonly calculate the organic matter content of soil by multiplying its organic carbon or nitrogen content by an empirical factor. This admittedly has a certain degree of validity. We know that organic materials from widely divergent sources of highly variable composition are, in time, converted in the soil into a characteristic soil product which we call humas. This material is much less variable in composition and properties than the original residues from which it was derived. The bulk of the organic matter, usually 85 to 90 percent of it, is stored in the soil in this humified form. I do not mean to imply that this material is a single chemical entity. Many Ph.D. degrees have been won by developing methods of separating it from the soil and dividing it into different fractions, usually on some arbitrary or empirical basis. In spite of all this, I think there is justification — even a degree of necessity — for our present purpose, at least, in thinking about the organic matter in the soil as existing in two major categories. First, the fresher and newer fraction which is in various stages of decomposition, and which constitutes the raw material from which humus is made. This fraction of the organic

* Delivered by Dr. Richard Bradfield, Head, Department of Agronomy, Cornell University, at the 28th Annual Southern Convention of The National Fertilizer Association held at the Hollywood Beach Hotel, Hollywood, Florida, November 10-12, 1954.

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matter is physically incorporated in the soil, but it is not yet of the soil. It has a very transient existence, and usually makes up 10 percent or less of the total in the case of mineral soils. Second, the older, more stable fraction, which is more uniform in both physical condition and chemical composition than the fresher material, and which usually makes up 90 percent or more of the total organic matter contained in most mineral soils. This fraction is the soil organic matter in the strictest sense. It is the form in which most of the nitrogen and a very high proportion of the phosphorus is stored in the surface soil. It is the fraction which, more than any other, distinguishes top soil from subsoil, and fertile soils from depleted soils. Much of this organic matter is bound chemically to various inorganic constituents. This is the only fraction that can be maintained in the soil for very long, for it is the form to which all organic matter tends to pass as it accumulates in the soil under favorable farming conditions.

Only a little over a century ago, it was regarded as the probable source of the bulk of the carbon in plants. Practically all of the nitrogen stored in the soil is in this fraction. The carbon-nitrogen ratio is fairly constant and much narrower than most of the fresh plant residues which find their way into the soil. While it is the most stable form of organic matter in the soil, it is decomposed at a characteristic rate, usually from 1 to 2 percent a year. This depends upon the reaction of the soil, its drainage status, the cultural practices used, and many other factors. When crops are grown in continuous culture it has been found in many places that the yield of crops obtained without fertilization is usually a linear function of the content matter in stored form. This is probably due to the fact that under such conditions the yield of crops is determined by the amount of nitrogen released from the organic matter, and the amount of nitrogen released, is, in turn, a function of the organic matter content of the soil.

There are other qualities of the soil however, which are greatly influenced by its organic matter content which do not bear a linear relationship to the quantity of organic matter present. We know, for example, that heavy soils can contain very large quantities of humified organic matter and still have very poor structure. When such soils are poorly managed, crop yields decline much faster than 2 percent a year.

The fact that soil organic matter content declines at a relatively slow rate, 1 percent to 2 percent a year normally, while other properties affecting crop yields, such as structure, decline at a much more rapid rate, indicates that we must recognize that we are dealing with different forms of organic matter. Let us next consider briefly some of the characteristics of the non-humidified forms.

These materials are made up of a very wide range of original materials. Plant roots, stubble, fallen leaves, animal manures, soil microorganisms, make up the bulk of the parent material. All of these materials may be present in a very wide range of state of decomposition, from the fresh state at the one end of the cycle, to the completely humified state at the other end. This is the much more dynamic fraction. In degree of complexity, it will range from the simple end-products of decomposition of very transient existence, through innumerable intermediate products which also have only a temporary existence in the soil, such as amino acids, many polysaccharides, fats, antibiotics, etc., to the highly complex and relatively

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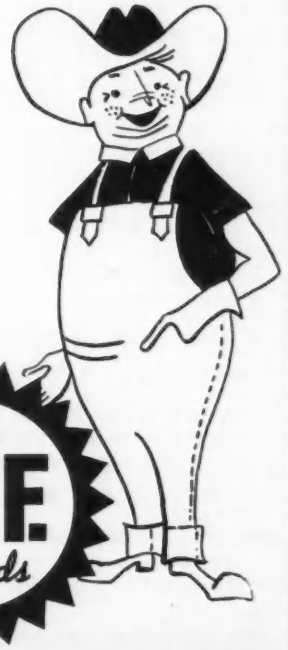

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resistant end-product which we have referred to above as the humified fraction. Because this fraction is more easily decomposed by soil microorganisms, microbiological activity is much greater in its presence. As a result, carbon dioxide is produced at a more rapid rate. Carbon dioxide dissolved in the soil water increases the solubility of many of the mineral nutrients in the soil. The increase in microbial population brought about by the more abundant food supply also seems to accelerate the rate of decomposition of even the humified fraction of the soil organic matter. These crop residues may have a very pronounced effect upon the physical properties of the soil. The roots of crops, especially of crops producing a very abundant root system, like grass sods, have a very important effect on the structure of the soil. This effect is a complicated one. There is unquestionably a direct physical effect of the root fibers themselves in keeping the soil loose and porous, but in addition as the roots decompose there is considerable evidence that they yield complex polysaccharides and other similar materials which have a marked influence upon the formation and stabilization of soil granules. While either total carbon or total nitrogen content is a fairly satisfactory rough criterion of the amount of humified material in a soil, since the humified material makes up 85 to 90 percent of the total, it is not an adequate measure of the influence of the non-humified organic matter. For example, an amount of organic matter which is within the normal field sampling error may have a very marked effect on plant growth and upon the physical properties of the soil. A single application of manure may bring about a very marked increase in the yield of certain crops. A clover or alfalfa sod may increase the yield of the succeeding corn crop by 20 to 25 bushels per acre. One or two years in grass sod will produce a marked effect upon the physical properties of many heavy soils the first year they are plowed up and put in a cultivated crop. The classical experiments at Rhode Island on the effects of crops on those which follow are illustrative of a different type of effect.

The non-humified fraction of the soil organic matter bears somewhat the same relationship to the humified fraction that the available plant nutrients bear to the total analysis. I think it is obvious, when we stop to think about the facts mentioned above, that it is indefensible scientifically to speak of soil organic matter as an entity. If we are to make maximum use of organic materials in soil management, we must be more specific in our thinking and planning our experiments in field and labortory.

Let us review briefly some of the things we have learned in the last 100 years about the role of soil organic matter in crop production. Since organic fertilizers were the oldest fertilizers, it was natural that when chemical fertilizers were introduced about 100 years ago scientists should want to compare their effectiveness in field trials. One of the oldest experiments at Rothamsted in England was such a test. In this case they analyzed the manure, and for the chemical fertilizer used a combination of salts which would have approximately the same inorganic composition. This test was continued for a long time. It showed that the crop responses to the two fertilizers did not vary widly, but that the chemical fertilizer was quicker acting and gave somewhat better results the first few years, but that the difference became smaller with time, and eventually the manure pulled ahead. When the annual treatments were discontinued, the residual effects of the manure were much greated in magnitude and lasted for much longer. This indicates that a combination of organic and chemical fertilizers might be superior to either used alone.

In searching for a yardstick for measuring the inherent fertility of different soils, it was found in several stations, Ohio, and Missouri particularly, that the organic matter content of the soil was the most reliable, provided that other factors such as drainage and pH value were satisfactory.

When soils are used to grow intertilled crops like corn or potatoes, the organic matter content of the soil declines about 2 percent a year in the Corn Belt area. If a perennial leguminous sod crop, like clover or

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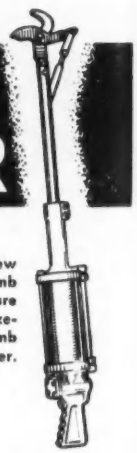

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alfalfa, is grown in a rotation with corn, it will add to the soil from the atmosphere about as much nitrogen as the average corn crop will remove.

If, in addition to growing the legume in the rotation, we feed the legume and the corn to livestock, use the other crop residues for bedding, and then return the manure to the soil, the organic matter content of the soil and the yield of crops can be maintained at higher than present average yields with the addition of limestone where needed, and by the use of very modest applications of phosphatic fertilizers. On soils having a fairly good reserve of fertility to start with, these practices will maintain corn yields at 75 to 80 bushels per acre almost indefinitely. I base this on the results of long time experiments at Wooster, Ohio, and the famous Morrow plots in Illinois. While crop residues and organic manures usually have a greater residual effect than chemical fertilizers, they are most active on a pound dry matter basis when freshly applied. The effect of the residues of the crop immediately preceding, particularly if it is a leguminous crop, is usually greater than that from the total accumulation of all older residues combined. (Cornell data.)

On very heavy clay soils, the yields of crops are often influenced more by the effect of the preceding crop on the structure of the soil than they are by chemical fertilizers. The beneficial effects of sod crops on the structure of such soils is brought about largely in the first 1 to 2 years, and when the sod is plowed up and planted to an intertilled crop the effect disappears just about as quickly. In an experiment started in 1939 at the Paulding County Experiment Farm in Ohio, corn yields in 1949 varied from 15.9 bushels per acre on the continuous corn plots to 102 bushels per acre where corn followed a sweet clover — orchard grass sod. Crops seldom respond to chemical fertilizers on the soil unless its structure is improved.

The classical experiments on the influence of crop plants on those which follow (which have been in progress at the Rhode Island Experiment Station since 1907) present much additional evidence of the importance of the short time effect of crop residue upon the yields of the following crops. This is a complex experiment and cannot be analyzed in detail. In a recent publication dealing with these experiments, Odland, Bell and Smith (4, p. 27) state: "the least favorable crops to precede mangels were carrots, mangels and millet. Potatoes, rutabagas and millet were most deleterious to a subsequent crop of potatoes. Low yields of rutabagas followed mangels, millet or rutabagas, while onions were unfavorably affected by preceding crops of mangels, cabbage or rutabagas. It seems significant that for three crops out of four, millet, mangels and rutabagas proved to be deleterious. Rye, oats, and onions were usually followed by high yields of the subsequent crops . . . . . No simple explanation exists for the effect of crop plants on those that follow. The relationships are complex and are associated with the chemical, physical and microbial conditions in the soil. These conditions are interdependent. An unfavorable soil reaction, for example, may accentuate a poor physical condition of the soil and retard vital microbial activity." It should be pointed out that in this experiment, especially in the more recent phases, the crops were very well fertilized in order to minimize any effect due to an insufficient nutrient supply.

(Concluded Next Issue)

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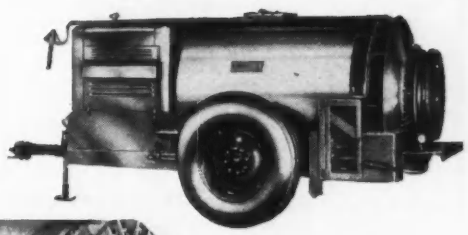
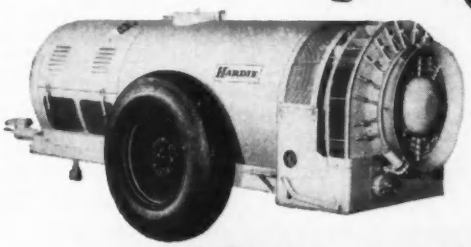


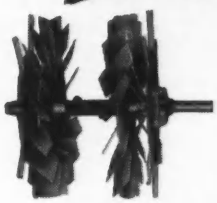


HURRICANE®

Model DF-26B, left

Completely streamlined. Unusually narrow tread. Two, 26 in. fans. Powered by the Ford Industrial Engine, delivering 108 HP at 2600 RPM. The Hardie pump delivers 70 gpm at 125 psi.

HARDIE ALONE HAS IT!



The 2-Fan Sprayer
You've Been Asking For

Two, axial flow fans, mounted with opposed blades on a single shaft and scientifically balanced constitute the amazing, new feature of the Hardie Hurricane Duo-Fan Sprayers. The advantages of this 2-fan assembly are priceless. Here's what it does:

- Gives you an absolutely uniform distribution of air and spray over the entire radius of fan housing and boom.
- Delivers tremendous, maximum, high velocity air volume at slow speed.
- Accurate, scientific fan balancing eliminates wear and tear of excessive vibration.
- All controls under the hand of tractor driver.
- Handles concentrate, semi-concentrate and dilute sprays.

Two fans are better than one. Find out what this means to you.

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Cootie Hardware Furniture Co., White Springs
Daytona Truck and Tractor Equipment Co., Daytona Beach
Florida Truck and Tractor Co., Palatka
Florida Motor and Equipment Co., Gainesville
Glades Equipment Co., Belle Glade
Glades Equipment Co., Pahokee
Howe E. Moredock Co., Homestead
Howe E. Moredock Co., Miami
Indian River Farm Supply Co., Vero Beach
Minton Equipment Co., Ft. Pierce
Naco Farm Supply Store, Vero Beach
Peninsular Equipment Co., Inc., Wauchula
Pompano Truck and Tractor Co., Pompano
Pounds Motor Co., Winter Garden
Pounds Tractor Co., Winter Haven
Quinn R. Barton Co., Jacksonville
Russell Farm Supply Store, Palmetto
South Florida Motor Co., Arcadia
South Florida Motor Co., Sebring
South Florida Motor Co., Fort Myers
South Florida Motor Co., Immokalee
Thompson Tractor Co., Tampa
Wild Animal Compound, Inc., Vero Beach

Ask your dealer. Write for the new Hardie Catalog.

HARDIE
PEST CONTROL EQUIPMENT
• SOLD AND SERVICED

The Hardie Mfg. Co., Hudson, Michigan
Please send Sprayer Catalog.

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ADVERTISEMENT — LYONS FERTILIZER COMPANY

Uncle Bill Says:

Sometimes it seems to me that we fuss and fume a lot when we'd be doin' better just tendin' to our business . . . like this here Yalta business which was a conference held mor'n 10 years ago in which Roosevelt, Churchill and Stalin played important parts . . . now the full details of the conference has jist been made public and most everyone figgers that these three big-wigs made some mistakes . . . well we ain't goin' to argue 'bout that phase of the thing 'cause we think some mistakes were made too, but havin' to wait more'n 10 years to find out fer sure seems like now we should've let 'em lay . . . and spend more and more of our valuable time in checkin' up on conditions as they are today . . . or maybe just concentratin' on the job of tending to our own personal business jist as hard as we know how.

Gittin' right down to this business of makin' a living out growin' citrus we can't remember hardly any time when us citrus growers wasn't moanin' and grownin' about what a tough business we were in and how prices were always lower'n our production costs . . . still in spite of all this the average grower seems to be getting along right well, and thousands of acres of new trees is being planted every year . . . which leaves us still convinced that the Florida citrus grower is a pretty lucky feller after all.

'Cause the guy who comes down from the Arctic circle with the notion that all he's got to do is to buy a few acres of citrus grove 'n sit back with his feet on the porch rail and watch the money roll in is due fer something of a shock . . . 'cause producin' citrus is like any other business, it takes sound management and hard work, a lot of times, to make it pay off . . . but in the long run we'd venture the opinion that us growers don't have to work any harder or take any more chances than folks who has the same amount of money invested in most any other business.

One thing that is sure to help any citrus grower . . . and that is the use of Lyons Fertilizers . . . a heap of growers over Florida has learned this fact over years of first hand experience.

ADVERTISEMENT — LYONS FERTILIZER COMPANY

The LYONIZER

COMPILED BY THE LYONS FERTILIZER COMPANY

Reports Of Our Field Men . . .

SOUTHWEST FLORIDA
Eaves Allison

A very large citrus bloom in this area is setting a fine crop of oranges, grapefruit and tangerines. Continuing dry weather is reducing this volume daily, as the pin-head size fruit on the ground will show. Irrigation in those groves which have it is reducing this drop to a minimum. From now on liberal applications of that good Lyons Fertilizer will be necessary to produce desirable sizes. Remember, you can't short a big crop on plant food and still get good fruit sizes.

Stands of tomatoes in this area following the February freeze are spotty, but very healthy and vigorous, with the new re-plantings growing off well. The dry weather of this period — middle of March — is very much in the vegetable grower's favor. Cuke crops that were re-seeded after th freeze are growing well but there remains the bug-a-boo of several sections coming in too close together for comfort.

Glads are bringing in large flower crops with a depressing effect on the market from sheer volume. Quality is high and there is a good prosepct that the growers will end the season with a profit.

Eaves Allison

NORTH HILLSBOROUGH AND PINELLAS COUNTIES
J. A. Hoffman

At this time, March 18th rain seems to be the main subject, due to the long dry spell and heavy bloom. The most of this section hasn't had any rain since the last of January and it is getting very dry in some places. A few growers started irrigating the first week in March. Most all growers with irrigation facilities have started irrigating or are preparing to start.

The spring application of fertilizer will be completed in this section by the 20th of March. Young trees have been fertilized and the banks pulled down. It will soon be time to fertilize young trees again approximately April 15th.

Purple Mite and Scale are very active at this time, but will soon be under control with a post-bloom spray.

SOUTH POLK, HIGHLANDS, HARDEE AND DESOTO COUNTIES
C. R. Wingfield

By the middle of March we have found ourselves saying "Where has the moisture gone". It has been necessary to put irrigation equipment into operation both in groves as well as on the vegetable farms. There have been good growing conditions since the last cold threat, however, on the morning of March 9th we were confronted with a frost altho very little damage has been reported.

The Citrus bloom has been very good with the Valencias being lighter. There has been a heavy loss of leaves possibly from Rust Mite, Purple Mite and cold winds or a combination of all three. This appears to be more noticable in Hamlins and Pineapples altho they have recovered much of the foliage loss with a heavy flush of growth. We are all concerned about the Purple Mite and various means of control is being used as weather conditions will permit.

The vegetable grower has been a busy man and the crops are looking good after a few days of growing weather. There has been some cukes brought to Wauchula market and prices good. April 15th. will possibly bring many tomatoes and cukes to the market.

NORTH CENTRAL FLORIDA
V. E. Bourland

We are having cool nights with hot days, and is awfully dry, most groves have put out new growth with a wonderful bloom, but if we don't get some rain soon lot of growers think most of it will go on the ground. Some irrigation plants have been going for the last week or ten days, other growers are cultivating. Most all midseason oranges have been picked and some valencias are moving.

Most all growers have worked and fertilized their young trees. Melon growers are feeling better as their crops are looking good on the last planting. All pastures are beginning to come out, and rain would be very welcome by all.

HIGHLANDS AND POLK
J. K. Enzor, Jr. & R. E. Lassiter, Jr.

The bloom in Polk County at the time of this writing is very well advanced as well as being very heavy. There are very few groves that do not have this bloom.

Many growers have begun their irrigating. Even though we have not seen any appreciable amount of wilting, it has begun to get dry in spots.

We have begun to observe some rather heavy infestations of six-spotted mites. Groves should be watched very closely at this time for these mites since they can cause considerable damage in a very short period of time.

Purple mites still seem to be a problem in some groves and will continue to be until such time as we begin to get rain.

Young trees that have not been fertilized to date should be receiving fertilizer as soon as possible.

EAST HILLSBOROUGH AND PASCO COUNTIES
E. A. McCartney

It is getting dry all through this territory — Some growers are irrigating their groves. There is a heavy bloom on the trees and if a good crop is set we will have to have rain soon. There is not much activity at this time by fruit buyers as the growers are expecting an advance in valencia oranges. Grapefruit is still hardly worth picking.

Red spider and scale are giving trouble in some spots. Groves are looking good. You can drive all day and see very little bronzing and other deficiences which is the result of proper care.

The berry crop has passed its top production after a bad start due to the weather. Melons are up now and are doing all right after what looked like a bad season for them. Pastures are being fertilized, and we are busy here at Lyons taking care of our customers.

Lyons Fertilizers Produce Maximum Crops of Highest Quality

A Start for the Camp

It's for the new 4-H club camp, says Andrew Duda, jr., right, president of the Florida Fruit and Vevetable Assn., as he presents a check for $5000 to District Agent K. S. McMullen of the Agricultural Extension Service. This is the first of two checks which will be used to erect staff cabins at the new state 4-H camp near Lake Placid, the fifth permanent camp to be owned and operated by the Florida Agricultural Extension Service to give both 4-H boys and girls and adults an opportunity to gain both recreation and information at camp.

CITRUS INSECT CONTROL FOR APRIL, 1955

(Continued from page 3)

for light infestations and 1 2/3 pounds for heavy infestations of purple and red scale. As mentioned above, practically all spray materials may be combined with parathion.

Where mealybugs are present use parathion at 1.66 pounds per 100 gallons. Apply the spray before the fruit gets so large that the calyx fits close to the fruit. If the spray is applied before the calyx touches the fruit, very satisfactory control of mealybug can be obtained. Check late bloom fruit for the presence of mealybug as well as egg masses along the tree trunk. Only a few egg masses at the present time may develop into a rather heavy infestation by July.

Purple Mite Control: An oil emulsion is the most effective miticide for the control of this mite, but limitations on the use of oil at this time of the year are the same as where it is used for scale control. Where it is not advisable to us oil, either ovex or aramite can be used. If purple mite eggs are very numerous, it is probably advisable to use ovex especially if showers are occurring. Ovex is an ovicide and has not been affected as much by rains as other organic miticides. EPN has been rather effective and safe but it is a phosphatic compound and the same precaution should be taken as with parathion.

Six-spotted mites are controlled with the same materials as purple mites. In addition, two gallons of lime-sulfur plus 5 pounds of wettable sulfur per 100 gallons results in fair control. A very thorough application must be made with any of these materials.

Rust Mite Control: A combination of 1 gallon of lime-sulfur plus 5 pounds of wettable sulfur per 100 gallons results in the longest period of control. Wettable sulfur at 8 to 10 pounds per 100 gallons is also very effective and is usually used at this time of the year in combination with other materials. Sulfur dust may also be used for light infestations.

For more detailed information refer to the 1955 "Better Fruit Program" or consult the Citrus Experiment Station at Lake Alfred or Fort Pierce.

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CITRUS GROVE MANAGEMENT
The Very Best of Service to Grove Owners of either Large or Small Groves
Servicing The Polk County Area
LOGAN & RICKBORN INC.
LAKELAND, FLORIDA
2600 Orleans Avenue — Call 6-0501

CANADIAN CAMPAIGN VERY SUCCESSFUL

The Florida Citrus Commission's promotion in Canada during January and February has been outlined by a well known Canadian trade magazine "The Canadian Food Store Journal" as an . . . "extremely successful grapefruit promotion."

In the March issue of the Journal, a Florida grapefruit display is colorfully depicted on the magazine cover, and is reproduced along with a feature story on the editorial pages of the same publication.

"It is estimated that sales of the fruit increased by 60 per cent during the period," says the story, "a result of wholehearted cooperation between importers, wholesalers, and retailers.

"Food merchants who cooperated in this grapefruit promotion found that sales were even greater when reminder pennants were posted throughout the store in all departments," concludes the magazine article.

Classified Ads

FOR SALE: Hairy Indigo Seed, Common (late) Indigo $38.00 CWT, Early Indigo $40.00 CWT, F. O. B. Haines City, Florida. Good purity and germination. Order early, short crop. Lewis & Vickers, Box 1117, Haines City, Florida.

FOR SALE — Limited number of Our Improved Jewel Peach Trees on Nematode Resistant Stock. CLAY HILL NURSERIES COMPANY, Box 2880, Tampa, Florida.

SUPERIOR CITRUS TREES — Now accepting orders for June delivery of Valencia and Pineapple on Rough Lemon. Some other varieties are available now for immediate planting. For quotations call us 2-7541 or write WARD'S NURSERY, Box 846, Avon Park, Florida.

PERSIAN LIME TREES — Ready for delivery. Other popular varieties all on rough lemon root, for delivery now or January, 1955.
ADAMS CITRUS NURSERY
1700 Villa Road Winter Haven, Fla.

FOR SALE
Several thousand Parson Browns on Sour Root Stock, 1" to 1½" caliper. Also have Navels, Pineapples, Dancy Tangerines, Valencias, Murcoits — Pretty Trees. Contact J. EDWIN CAUTHEN, P. O. Box 342, Leesburg, Florida.

ARAMITE®

KILLS MITES

The safest, most effective citrus mite killer on the market

Citrus yields are better, citrus sales bigger when you apply Aramite. It's today's safest, strongest, most profitable way to combat the ever-present mite menace.

Extensive usage has proved Aramite gives effective immediate and residual control of Purple Mite (Citrus Red Mite) and Six-Spotted Mite on citrus. Recommended by the Florida Agricultural Experiment Station. Aramite is effective against mite adults, nymphs and eggs—immediately stops feeding of adults and young and kills within 72 hours. Field usage has definitely established Aramite-Sulfur compatibility—whether Aramite is tank-mixed with wettable sulfur or field-sprayed before or after sulfur dusting or spraying. Safe on citrus, leaves no harmful residue, is non-hazardous to handlers and does not kill off beneficial insects.

Order Aramite from your local supplier today. Write, wire or phone us if unable to locate immediate source of supply.

Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut

producers of seed protectants, fungicides, miticides, insecticides, growth retardants, herbicides: Spergon, Phygon, Aramite, Synklor, MH, Alanap, Duraset.

The Fruit You Pro
No Better Than Y

For a long, long time every grower has been aware of the fact that High Quality Fruit brought him better returns for his citrus crop than inferior fruit would bring.

And it is just as much a foregone conclusion that in order to raise High Quality Fruit in adequate volume it is necessary to have strong, healthy trees.

In order to have such trees Florida Growers have long since adopted the practice of seeing that their citrus trees were adequately and properly nourished by the application of high type fertilizer which has been designed to care for the requirements of each particular grove.

The fact that so large a number of the state's most successful growers have continued throughout the years to apply Lyons Fertilizers to their groves furnishes ample proof of the high quality of our fertilizers as is reflected in the exceptionally fine crops they produce.

In the event you have problems in cultural practices or in production we are prepared to help . . . . our Field Service Men will gladly give every possible service and counsel to you.

We will be proud to serve you and feel certain that you will be more than pleased with the service we can give you.

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